Determinants of Net Interest Margin for Banks Operating in Palestine

محددات صافي هامش الفائدة للمصارف العاملة في فلسطين

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Abstract

The goal of this research is to identify the factors that influence the net interest margin (NIM) for Palestinian conventional banks. Palestine is a unique country with poor governance, political uncertainty, and regulatory insufficiency, adding higher information asymmetry to the decision-making process. The sample is comprised of unbalanced panel data from 15 commercial banks for the period 2011–2020. The research used a pooled OLS, a fixed-effect model, a random effect model, a robust pooled OLS, a difference GMM, and a system GMM estimators. Evidence collected supports that net interest margin is positively influenced by risk aversion, operating costs, and loan-to-deposit, while being negatively related to credit risk. The effect of size is positive but not robust. The results imply that banks and policymakers can increase efficiency by better controlling these factors. Particularly, operating costs can be reduced by implementing efficient banking technologies and improving management practices that reduce the cost of staff. In future research, other factors should be considered, including the bank's ownership structure and type, whether Islamic or conventional.

Keywords: Net interest margin, dealership model, determinants of net interest margin, Palestinian banks.

ملخص

تهدف هذه الدراسة الى تحديد العوامل المؤثرة في صافي هامش الفائدة للمصارف التجارية العاملة في فلسطين، تعتبر فلسطين حالة فريدة للدراسة بسبب ضعف الحوكمة وعدم اليقين السياسي وعدم كفاية التشريعات مما يؤدي الى زيادة مشكلة عدم تماثل المعلومات في عملية اتخاذ القرارات، تكونت عينة الدراسة من بيانات مدمجة غير متوازنة (Unbalanced panel data) لعدد 15 مصرفا تجاريا مارست عملها خلال الفترة من 2011 وحتى 2020. تم تقدير النموذج باستخدام عدة مقدرات هي: المربعات الصغرى المجمعة، الاثر الثابت، الاثر العشوائي، المربعات الصغرى الراسخة (Robust OLS)، وطرق العزوم العامة (GMM). دعمت النتائج وجود علاقة موجبة بين صافي هامش الفائدة وبين درجة تجنب البنك للمخاطر، التكاليف التشغيلية، ونسبة القروض للودائع، بينما وجدت الدراسة علاقة سالبة مع مخاطر الائتمان، ايضا ظهر اثر الحجم موجبا ولكنه ليس مستقرا في النماذج المختلفة، هذه النتائج تعني امكانية زيادة كفاءة البنوك من قبل اداراتها او صانعي السياسات من خلال التحكم المناسب بالعوامل السابقة، بشكل خاص يمكن تخفيض التكاليف التشغيلية من خلال تبني التكنولوجيا الحديثة وتحسين الممارسات الادارية التي تخفض تكلفة الكادر البشري، يقترح البحث للدراسات المستقبلية ان يتم ادخال عوامل اخرى لاختبارها مثل هيكل الملكية ونوع البنك من حيث كونه تقليديا او اسلاميا.

الكلمات المفتاحية: صافي هامش الفائدة، نموذج البنك الوسيط (التاجر)، محددات صافي هامش الفائدة، المصارف الفلسطينية.

Introduction

Through the movement of cash from a saver to a lender, banks serve the economy as a middleman. Banks promote economic growth while also assisting the government in maintaining control over the money supply (Jadah, Alghanimi, Al-Dahaan, & Al-Husainy, 2020). As a result of globalization, the banking system's inefficiencies may result in a financial crisis that spreads to other sectors and even to other countries. Global financial crises, the crisis of 2008 is one example, are mostly due to bank malfeasance. The crisis began with banks' laxity in providing mortgage loans to customers with low credit ratings and ended with default. The crisis changed bank health criteria and asserted that adequate capital is the guarantee of financial stability where banks can improve their capital by increasing profitability (Angori, Aristei, & Gallo, 2019).

The net interest margin (NIM) is a measure of a bank's profitability represented by the difference between interest earned from clients and interest given to depositors (Dumičić, & Rizdak, 2013). Net interest margin,

according to Angbazo (1997), depicts the mix and magnitude of bank intermediation costs. Angori et al. (2019) assert that net interest margin evaluates a bank's health and efficiency in performing intermediate responsibilities. Abdulhakim (2019) realizes that net interest margin illustrates the continuation of a bank, the financial expenses on the economy, and demonstrates bank profit from core operations. NIM is a measure of intermediation efficacy (Fungáová & Poghosyan, 2011). High intermediation margins indicate inefficiencies in the financial system and stifle economic progress (Hamadi & Awdeh, 2012). Real economy views NIM as a significant factor in determining the interest rate level for the private sector adjusted to the anticipated risks. Hence, in a bank-based economy, there is a significant link between loan availability and banking sector margin stability (Dumičić, & Rizdak, 2013).

To better understand the factors that determine net interest margin, literature references bank-specific (e.g. Asmar, 2018; Fungáová & Poghosyan, 2011), macroeconomic (e.g. An & Loan, 2017; Endri, Marlina, & Hurriyaturrohman, 2021; Suu, Luu, Pho, & McAleer, 2020), regulatory, and industrial factors (e.g. Angori et al. 2019, Abdulhakim, 2019; Khan & Jalil, 2020). According to empirical research, drivers of net interest margin vary by country (Hamadi & Awdeh, 2012).

This study contributes to the existing literature in two ways. Firstly, studies on the determinants of net interest margin from emerging market contexts are limited and the results are conflicting (Obeid & Adeinat, 2017; Khan & Jalil, 2020; Abdulhakim, 2019). We investigate this limitation by covering banks in Palestine. Palestine offers a unique context for this study in many aspects. Palestine is a country under occupation but has gained little autonomy on interior issues since 1994. Occupation authorities control most resources and all borders with the outside world and between parts of the country (Abdeljawad, Oweidat, and Saleh, 2020; Abdeljawad, Dwaikat, & Oweidat, 2020). The movement of capital is highly restricted due to this occupation, and banks suffer largely from this constraint and the strict application of anti-money laundering rules. Palestinian banks operate under the strict supervision of the Palestinian Monetary Authority

(PMA), which performs all of the tasks of a central bank except the issuance of money (Asmar, 2018). According to Angori et al. (2019), interest rate margins are bigger in nations with strict capital regulations. Secondly, Palestine is an underdeveloped country with a higher level of political instability and a weak rule of law (Abu Alia, Abdeljawad, and Yaaqbeh, 2020, Abdeljawad & Masri, 2018). The Worldwide Governance Indicators ranked Palestine with suboptimal performance for 2019 in terms of the indicators of rule of law (144 out of 214 countries), government effectiveness indicator (166 out of 214), voice and accountability (171 out of 214), and political stability and absence of violence indicator (204 out of 214 countries) (World Bank, 2020). Poor governance, political uncertainty, and regulatory insufficiency result in incomplete disclosure and inferior governance guidelines that advocate information asymmetry (Abu Alia et al., 2022). We argue that in unstable contexts, banks are subject to a high level of information asymmetry, which leads them to increase the net interest margin. Moreover, extant investigation into net interest margin in Palestine and similar extreme environments is rare. Expected results can be applied to other countries with similar environmental settings. We also set our study apart by using different estimation methods to make sure the results are robust.

To control the net interest margin of a bank, bank management and policymakers need to pay attention to the factors that change the NIM in Palestine. This study's objective is to determine the factors that affect NIM for Palestinian conventional banks in order to help banks improve their profitability and to help policymakers pursue policies that ensure the stability of the financial system.

The following is how the research goes: The backdrop of the banking industry in Palestine is outlined in Section 2. The theoretical framework is presented in Section 3. The research technique is presented in Section 4. The results and comments are presented in Section 5. Finally, section 6 wraps up the research and makes suggestions.

Background on the banking sector

In Palestine, the banking industry is the backbone of the financial system, providing funding to both the private and state sectors. Bank finance in Palestine is boosted by the country's poor capital market, which lacks both debt and seasonal equity issuances. Before the Israeli occupation of Palestine in 1967, eleven commercial banks were operating in the West Bank and Gaza Strip, with thirty branches (four of which were in the Gaza Strip) (Abbadi & Karsh, 2013). Only Israeli banks were allowed to operate in this sector from 1967 until 1989. The Paris Protocol, which formed the PMA (Al-Jerjawi, 2016) and allowed new banks to operate, established the Palestinian financial system in 1994. Currently, the PMA regulates banks, microfinance institutions, money exchanges, and internet payment services. In the West Bank, and the Gaza Strip, there are now 13 banks (seven local banks, 4 commercial and 3 Islamic, and six foreign banks) with 380 branches (Palestine Monetary Authority, 2021a). The number of banks varied over the last 10 years due to new entry and mergers and acquisitions. Deposits were about $17.6 billion at the end of the third quarter of 2021, and credit was about $10.4 billion, with an insolvency ratio of 4.28 percent (Palestine Monetary Authority, 2021a). For the main currencies traded in Palestine, the interest rate spread at the banking sector level varies. For example, the average net interest margin rate on the US dollar was roughly 5.76 percent in 2012, 3.60 percent in 2018, and 3.08 percent in 2020, whereas for the New Israel shekel it was 7.98 percent in 2012, 5.06 percent in 2018, and 4.65 percent in 2020 (NIS) (Palestine monetary authority, 2021b).

Theoretical framework

To quantify the cost of financial intermediation, net interest margins compared the gross cost paid by borrowers to banks and the net return obtained by depositors. The "dealership model" was established by Ho and Saunders in 1981. In this concept, banks are "dealers," requesting certain deposits and providing certain loans. Banks suffer a lot of risk and cost in performing this role. This cost arises from the stochastic behavior of depositors and borrowers. Because depositors and borrowers come at various times, banks must have either a long or short position in the short-term

money market. To compensate for the uncertainty created by asynchronous deposit and loan demand, the bank will seek an interest margin to cover both interest rate risk and credit risk. The dealership model is based on research on securities market dealer bid-ask pricing. A bank is seen as buying funds (deposits) at one price and lending them at another (the "ask" price). As a result, banks must deal with loan requests and deposit requests in a volatile money market environment (Maudos & De Guevara, 2004). So banks set their interest rates by benchmarking the money market rate.

Higher margins reflect a non-competitive market structure in addition to higher information asymmetries and insignificant regulatory environments which lead to positive risk premia (Claeys & Vander Vennet, 2008). High-interest margins are undesirable because they lead to disintermediation. Low deposit rates discourage saving by making deposits unappealing while high lending rates make money more expensive for potential borrowers, reducing investment activity. While high net interest margins are typically linked with inefficiency, they can help a country's banking sector (Saunders & Schumacher, 2000). This occurs when banks reinvest significant spread gains into their capital bases. However, the absence of specific measures to control the poorly financed or unstable banks can lead to exceptionally low spreads. If weak banks are permitted to continue functioning, they may adopt lower lending rates to obtain market share or grow out of their problems. These banks will be candidates for spurring financial crises that spread into other sectors and countries.

The dealership model implies that risk aversion, operation size, market structure, interest on the deposit, the opportunity cost of the needed reserve, and the loan's default risk and interest variation are all factored into the model. McShane and Sharpe (1985) augmented the model by linking the uncertainty to the instantaneous rate of short-term money rather than deposit and loan rates. Allen (1988) included loan heterogeneity in the model and stated that cross-elasticity of demand lowered banks' pure margin. Angbazo (1997) investigated the impact of risk variables such as interest rate, default risk, and off-balance-sheet activities and interaction between credit and interest risk on net interest margin. Maudos and De Guevara (2004) extended the model to incorporate operational costs and the

Lerner index of the market power as direct metrics of competition. Lerner index measures the ability of a bank to set a price above the marginal cost. Valverde and Fernández (2007) extended the model to take into account non-traditional activity. When the bank has a multiple-output framework, two alternatives are exhibited: the bank can price loans relative to deposit and non-traditional activity relative to deposit. Entrop, Memmel, Ruprecht, and Wilkens (2015) improved the model by testing interest risk and expected transformation return. They claim that banks price the risk of loans and deposits separately based on their exposure. If there is a positive expected return on holding period on long-term exposure, banks lower the margin by reducing lending rates and raising deposit rates. In sum, banks boost deposits or lower lending costs depending on the extent of the maturity mismatch. Cruz-García and Fernandez de Guevara (2020) added the capital requirement and deposit insurance scheme to the model. When a bank granted a new loan, an additional obligated cost is produced that is depending on the volume of the loan. In addition, when a bank accepts a new deposit without loan demands, the bank will invest it in the money market after discounting a percentage that will go to the insurance of deposited funds.

The interest margin, which is the difference between the interest earned from consumers and the interest given to depositors is crucial in evaluating the profitability of a bank. There is no consensus in the literature on whether a large or low net interest margin is preferable. Net interest margins that are too high will hurt the economy (Hamadi & Awdeh, 2012). Others claim that a lower interest margin is preferable in a poor financial situation (Endri et al., 2021). Low-interest margins, according to Maudos and De Guevara (2004), increase social welfare. Banks should have a NIM that demonstrates the effectiveness and enhances the intermediary's function between surplus and deficit units. Determinants of NIM vary by country but the main factors addressed in the literature include bank size, risk aversion, credit risk, operational cost, loan to deposit ratio, and growth in GDP. In the following sections, the relationship of each factor with NIM is discussed.

Bank Size

The bank's size refers to the bank's scale in terms of assets or loan size. Larger banks have a competitive advantage, profit from economies of scale, and have easier access to funding than smaller banks. Several studies have looked into the effect of size on net interest margin. It was deemed positive by Maudos and Solís (2009) since large banks have large operations that are exposed to more risk, so they request more margin to compensate for it.

Afanasieff, Lhacer, and Nakane (2002) also found a positive effect of bank size on the spread. Raharjo, Hakim, Manurung, and Maulana (2014) argue that the bank's asset increase is the result of the expansion in loans. If the bank takes too many non-performing loans, the cost to consumers will rise to compensate for the greater loan loss provision, resulting in a higher net interest margin. Aboagye, Akoena, AntwiAsare, and Gockel (2008) found that bank size influences NIM positively, but its effect is small. However, Khan and Jalil (2020) thought it was a good idea for large banks to offer a wider range of loans which helps in lowering risk, resulting in improved performance at lower NIM. Fungáová and Poghosyan (2011) found that banks benefit from economies of scale helping banks to reduce NIM. Yuksel and Zengin (2017) argue that bank scale is beneficial up to a point, after which it degrades asset quality. Maudos and De Guevara (2004) confirm the negative sign. Moreover, Lee and Isa (2017) believed that banks are capable to bear sophisticated advanced technology and benefit from economies of scale to lower the NIM. Hawtrey and Liang (2008) found the increasing scale of loans is due to the reduction of unit cost. Zhou and Wong (2008) found that size lowers the NIM therefore, larger banks aggressively expanding in the credit market motivated by their direction to lower impaired loan ratios by working at lower margins. Furthermore, no effect was discovered by Cruz-García and Fernandez de Guevara (2020) Angori et al. (2019), An and Loan (2017), Obeid and Adeinat (2017), Islam and Nishiyama (2016), Schwaiger and Liebeg (2008), and Williams (2007). As more risk and more non-performing loans are associated with large operations in Palestine, we can come up with a hypothesis for testing the following:

H1: there is a positive association between size and net interest margin.

Risk aversion

Risk aversion, measured by capital ratio, is a measure of a bank's capacity to avoid hazardous events (Endri et al., 2021). It is a measure of a bank's strength and financial stability in emerging nations (lower default, secure the depositor, stable during macroeconomic changes) (An & Loan, 2017). Maudos and De Guevara (2004) found a positive association between risk aversion and NIM. The link with NIM was determined to be positive also by Fungáová and Poghosyan (2011) who found banks that are more risk-averse establish high margins. An and Loan (2017) believed that a higher capital ratio is important for developing countries, especially during economic changes since it provides more security to customers. Lee and Isa (2017) argue that equity is a costly source of financing and leads to reduce bank's profitability that forcing banks to work at higher interest margins. In their study, Hawtrey and Liang (2008) found that when bank managers are risk-averse they impose extra interest margins. Angori et al. (2019) discovered a positive link where risk aversion relates to a bank's attitude toward risk which has been rising since the financial crisis. As a result, banks with more risk-averse policies raised interest rates during the financial crisis, which is also consistent with Asmar's (2018)'s positive link due to cautious management. Khan and Jalil (2020) discovered that, due to solvency regulations, the market places pressure on banks' lending activities leading to a higher interest margin. Islam and Nishiyama (2016) found that solvent banks have a higher NIM. According to Obeid and Adeinat (2017), net interest margin and risk aversion have a positive relationship. Banks will dedicate money to capital strengthening as the ratio rises, resulting in a fall in bank liquidity. To entice new clients, banks will expand liquidity by raising loan and deposit rates, with lending rates rising faster than deposit rates. Aboagye et al. (2008) believe that banks with a higher capital ratio impose a higher margin to fulfill the return expectations of shareholders. Abdulhakim (2019), Entrop et al. (2015), Williams (2007) and Schwaiger and Liebeg (2008) confirmed the positive effect. However, Suu, Luu, Pho, and McAleer (2020), and Zhou and Wong (2008) found it

negative with NIM. Whereas, Endri et al. (2021) and Cruz-García, and Fernandez de Guevara (2020) found it irrelevant. Our hypothesis is as follows:

H2: there is a positive association between risk aversion and net interest margin.

Credit risk

Credit risk (CR) is the chance that a debtor may default on a loan when it is due to be repaid (An & Loan, 2017). According to Fungáová and Poghosyan (2011), credit risk has a negative influence on NIM. When a bank has a high non-performing loan (NPL) ratio, depositors will seek a higher interest rate on deposits to compensate for the bank's risk, which is a cost to the bank that will reduce the bank's net interest margin. Khan and Jalil (2020) discovered that credit risk and net interest margin had a negative connection since banks that do not have proper surveillance of loans and advances prefer not to increase loans rate in order to keep the market share. Williams's (2007) finding in the Australian context is consistent with this result where banks that target higher market share are sacrificing loan quality and mispricing credit risk. This is in line with the findings of Endri, Marlina, and Hurriyaturrohman (2021), who discovered that when a bank's financial status is deteriorating, banks prefer smaller net interest margins. Credit risk and net interest margin also have a negative relationship, according to Yuksel and Zengin (2017), where non-performing loans result in decreased interest revenue for banks, lowering their net interest margin. Brock and Suarez (2000) found a negative association in all sample countries except Colombia. The higher non-performing loans will reduce banks' income, which leads to a lower margin. Dumičić and Rizdak (2013) found a negative relationship because banks cannot charge interest in bad loans. On the other hand, Maudos and De Guevara (2004) found banks expecting higher credit risk to exhibit higher NIM. Lee and Isa (2017), Hawtrey and Liang (2008), and Drakos (2002) found the increase of credit risk to lead to higher margins. Schwaiger and Liebeg (2008) found banks adjust the prices of loans and deposits according to the credit risk and achieve risk premia. Asmar (2018) argue that banks in Palestine have a high NIM because they face greater unexpected credit risk, while

Suu et al. (2020) argue that banks shift credit risk to the borrower. Raharjo et al. (2014) also found that it is positively affecting NIM. As banks increase their loss reserve, this will encourage them to increase their interest revenue and NIM will rise as a result. Other studies found a positive effect (Angori et al., 2019; Abdulhakim, 2019; An & Loan, 2017; Gounder & Sharma, 2012; Tarus, Chekol & Mutwol, 2012; Valverde & Fernández, 2007). Other studies found no effect (Cruz-García, & Fernandez de Guevara, 2020; Islam & Nishiyama, 2016; Entrop et al., 2015; Ben Khediri & Ben-Khedhiri, 2011; Zhou & Wong, 2008; Aboagye et al., 2008). Banks that hold more risky loans will ask for more interest margins to compensate for the higher possibility of default risk (Angbazo, 1997; Drakos, 2002). Evidence on this variable is contradicted and equally solid, therefore, we built the following non-directional hypothesis leaving the direction of the relationship for empirical investigation.

H3: there is an association between credit risk and net interest margin.

Operating costs

Operating cost is a percentage that indicates a bank's efficiency in managing activity costs (Suu et al., 2020). Maudos and De Guevara (2004) found banks with higher average operating costs would operate at higher margins to cover the cost. The authors asserted the importance of the variable in explaining the NIM and claim that ignoring it might cause omitted variable bias. In their study, Zhou and Wong (2008) found banks rational in taking the operating cost and cost of capital into their consideration when pricing the loan and deposit rate. Fungáčová and Poghosyan (2011) found it positive with NIM. Banks pass on operational costs to customers who use their financial services. This is consistent with Suu et al. (2020) that banks transfer the operating costs generated by hiring employees or expanding bank services to customers by increasing loan rates, which increases margin. Lee and Isa (2017) showed that banks pass high operational cost to their customers in the form of higher margins. Hawtrey and Liang (2008) believed that managers impose higher NIM to offset the higher operational costs. Also, Gounder and Sharma, (2012) found that banks in Fiji transfer their high operating cost to their client. In line with

Ben Khediri and Ben-Khedhiri (2011), banks carry their higher operating cost to borrowers and lenders of funds. Cruz-García, and Fernandez de Guevara (2020) found that banks that operate with higher margin need to set higher margin to cover the cost. Tarus et al. (2012) and Schwaiger and Liebeg (2008) found a positive link as well. Maudos and Solís (2009) discovered that banks employ higher margins to cover their operating costs. Islam and Nishiyama (2016) found it positive with NIM as customers pay higher costs for inefficient banks in South Asia. Angori et al. (2019) and Khan and Jalil (2020) also claim that banks will increase NIM to cover operating expenses. Aboagye et al. (2008) tested operating expense components separately and found that staff and administrative costs increased NIM since the costs are transferred to consumers in a non-competitive environment. In terms of occupancy and depreciation, neither factor influences the net interest margin. Furthermore, Entrop et al. (2015) and Afanasieff et al. (2002) conclude that operating costs increase the NIM and Williams (2007) found it positive in Australia. However, Abdulhakim's (2019) finding is inconsistent with other literature. Their negative finding is demonstrated by regulations that obligate banks to keep the interest rates at a certain level in recent years. Moreover, they found the competition between Turkish banks is vital in preventing banks from passing extra costs to customers. Asmar (2018) found it insignificant claiming that banks cover their operating cost from commissions and non-interest fees. We write the hypothesis based in the consistent finding of literature:

H4: there is a positive association between operating cost and net interest margin.

Loan-to-deposit ratio

The loan-to-deposit ratio (LTD) indicates how much the bank has loan to cover short-term obligations (depositor withdrawals and interest payments) (Endri et al., 2021). It also demonstrates the methods through which banks can get cash to finance its loans (Islam & Nishiyama, 2016). Raharjo et al. (2014) discovered a positive relationship between loan to deposit and net interest margin. Because of the increase in loans to deposits, interest revenue exceeded interest expenditure, resulting in a higher NIM. Endri et al. (2021) claim it has a positive effect, while it was deemed negligible by

Islam and Nishiyama (2016) and An and Loan (2017). The following is the hypothesis:

H5: there is a positive association between loan-to-deposit ratio and net interest margin.

Growth in GDP

Finally, the entire monetary value of goods and services generated in a nation during a certain period is known as the gross domestic product (GDP). Obeid and Adeinat (2017) discovered GDP growth to be positive with NIM. During growth, investors have more confidence in starting a new business or expanding an existing one, which leads to more borrowing and increases bank interest revenue, resulting in a higher net interest margin. Claeys and Vander Vennet (2008) provide evidence from Western Europe that economic growth leads to a higher margin since there is a lower default of the borrowers hence banks increase granting loans. Drakos (2002) and Abdulhakim (2019), and Dumičić and Rizdak, (2013) found a positive relation as well. On the other hand, when economic development is evident, banks may extend their operations and impose lower interest rates on clients, consistent with Islam and Nishiyama (2016), who found the association with NIM to be negative. This is in line with the findings of Entrop et al. (2015), who discovered that during periods of economic boom, banks compete by cutting lending rates and lowering their credit acceptance criteria. Brock and Suarez (2000) said in the good economic conditions banks can raise capital by reducing lending rates, which are encouraged by lower default risk. Valverde and Fernández (2007) found that banks reduce their interest margin when the economy improves following a market interest rate increase. Others (Suu et al., 2020; Angori et al., 2019; Tarus, et al., 2012) also considered it negative. Cruz-García, and Fernandez de Guevara (2020), Maudos and Solís (2009) and Schwaiger and Liebeg (2008) found no effect. The hypothesis is as follows:

H6: there is a negative association between GDP and net interest margin.

Methodology

Data

To evaluate the factors determining net interest margin for Palestinian banks, a sample of fifteen conventional banks operating in Palestine for any period between 2011 and 2020 was selected. Since several banks have closed or merged with other banks during the period, and three Palestinian banks offer Islamic banking services hence excluded, a final unbalanced panel data was utilized. The analysis was conducted from 2011 to 2020, using yearly data following Fungáová and Poghosyan (2011). The choice of the period was motivated by the relative stability of this period after the 2008 financial crisis for the Palestinian economy and banking sector. Although, the consequences of the Covid19 pandemic on the banking sector were still trivial with the end of this period. The data was secondary and came from the Association of Banks in Palestine's consolidated financial statements (https://www.abp.ps/ar) and the World Bank's macroeconomic statistics on GDP in constant 2010 prices in USA dollars. The maximum number of bank-year observations in the unbalanced panel was 130.

Measurement of variables

Table 1 shows the measurement of the dependent and independent variables and the expected sign of each independent variable on the dependent variable in addition to the empirical references that support the measurement.

Table (1): Measurement of variables and the expected relationship with NIM.

Variable	Ticker	Measure	Empirical reference	Expected sign
Net interest margin	NIM	(Interest income- interest expenses) /Total assets	Khan & Jalil (2020), Angori *et al*. (2019), Asmar (2018), Obeid & Adeinat (2017), Yuksel & Zengin (2017), Lee & Isa (2017), Islam & Nishiyama (2016), Gounder & Sharma (2012), Fungáčová & Poghosyan (2011), Schwaiger & Liebeg (2008), & Aboagye *et al*. (2008).	Dependent

Continue table (1)

Variable	Ticker	Measure	Empirical reference	Expected sign
Size	size	Ln(total assets)	Angori *et al*. (2019), Yuksel & Zengin (2017), & Obeid & Adeinat (2017).	+
Risk aversion	CAP	Equity/ total assets	Cruz-García & Fern&ez de Guevara (2020), Suu *et al*. (2020), Angori *et al*. (2019), Asmar (2018), Yuksel & Zengin (2017), Obeid & Adeinat (2017), Lee & Isa (2017), Islam & Nishiyama (2016), Fungáčová & Poghosyan (2011), M audos & Solís (2009), Zhou & Wong (2008), & Maudos & De Guevara (2004)	+
Credit risk	CR	Loan loss provision / Total loan	Suu *et al*. (2020), Maudos & Solís (2009), Drakos (2002)	+/-
Operating cost	OC	Operating expenses/ total assets	Angori *et al*. (2019), Asmar (2018), Islam & Nishiyama (2016), Entrop *et al*. (2015), Gounder & Sharma (2012), Ben Khediri & Ben-Khedhiri (2011), Maudos & Solís (2009), Zhou & Wong (2008), & Maudos & De Guevara (2004)	+
Loan to deposit	LTD	Total Loan/ Total deposit	Endri *et al*. (2021), An & Loan (2017), Islam & Nishiyama (2016), & Raharjo *et al*. (2014).	+
GDP	GDP	GDP growth rate based on real prices of 2010	Suu *et al*. (2020), Angori *et al*. (2019), Obeid & Adeinat (2017), Islam & Nishiyama (2016), Entrop *et al*. (2015), Maudos & Solís (2009), Schwaiger & Liebeg (2008), & Drakos (2002).	-

Model and estimation methods

The paper will examine the hypothesized relationships in a static framework by estimating the following model:

$$NIM = \beta 0 + \beta_{1t}\, size + \beta_{2t}\, CAP + \beta_{3t}\, CR + \beta_{4t}\, OC + \beta_{5t}\, LTD + \beta_{6t}\, GDP + \varepsilon_{it}$$

where:

$\beta 0$: constant

$\beta_{1\text{-}6}$: coefficients of the independent variables

Size: the size of the bank

CAP: risk aversion

CR: credit risk

OC: operating cost

LTD: Loan to deposit

GDP: growth in gross domestic product

ε: disturbance term

The study uses the single-stage approach followed McShane and Sharpe (1985), Angbazo (1997), and Maudos and De Guevara (2004) since the two-stage approach (adopted by Ho & Saunders (1981), Saunders and Schumacher (2000), and Brock and Suarez (2000) requires large time series and cross-sections to ensure the precision of estimation (Maudos & De Guevara, 2004; Williams, 2007). The single-stage gathers all the variables in one equation.

The paper also examined the relationships in a dynamic setting where a lagged dependent variable is included as a regressor in the previous model. The dynamic setting has the advantage of accounting for endogeneity of variables since it is estimated using instrumental variables approach utilized by generalized method of moments (GMM) framework. The estimation of static models is carried out using pooled regression, OLS with robust standard errors, fixed effect, and random effect (Hawtrey & Liang, 2008; Tarus et al. 2012; Fungáová & Poghosyan, 2011) whereas the estimation of dynamic models is carried out using difference GMM (Arellano & Bond, 1991) and system GMM (Arellano & Bover, 1995; Blundell & Bond, 1998). The diagnostics of each model and the choice of the appropriate model is discussed with the results section.

Results

Descriptive Statistics

The descriptive statistics of the variables utilized in the investigation are presented in Table 2. The fifteen banks were studied in a sample from 2011 to 2020. The net interest margin ranges from 0.6 percent to 4.3 percent. The median is 3 percent, while the mean is 2.8 percent with a 0.007 percent standard deviation. A typical commercial bank's capital ratio in Palestine runs from 7.1 percent to 65.7 percent, with an average of 20 percent and a median of 14.8 percent. The credit risk runs from 0 to 4.5 percent, with a median of 0.4 percent and an average credit risk of 0.7 percent. In Palestine, the average operating cost of a commercial bank is 2.9 percent, with a range of 1.4 percent to 22.7 percent, a median of 2.7 percent, and a standard deviation of 2 percent. A typical commercial bank in Palestine has a loan-to-deposit ratio of 53.5 percent, with a range of 0 to 112 percent, with a median of 53.4 percent and a standard deviation of 19 percent. Finally, GDP growth is 2.5 percent, with a median of 2.6 percent and a standard deviation of 5.9 percent. It varies from -11.5 percent to 9.6 percent. In addition, there are a maximum of 130 observations for each variable. In Table 3, the mean of each variable is presented per year so that the evolution of the variables over time can be assessed.

Table (2): Descriptive Statistics of the variables.

Var.	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
NIM	0.028	0.030	0.043	0.006	0.007	130
SIZE	19.993	20.081	22.483	16.367	1.229	130
CAP	0.194	0.148	0.657	0.071	0.119	130
CR	0.007	0.004	0.045	0.00	0.008	109
OC	0.029	0.027	0.227	0.014	0.020	130
LTD	0.535	0.534	1.117	0.000	0.190	130
GDP	0.025	0.026	0.096	-0.115	0.059	10

Table (3): Mean of the variables per year.

Year	NIM	OC	CAP	CR	LTD	Size	GDP Growth*
2011	0.026	0.026	0.228	0.009	0.431	19.461	0.096
2012	0.027	0.026	0.222	0.007	0.513	19.534	0.061
2013	0.029	0.028	0.224	0.006	0.492	19.607	0.047
2014	0.028	0.030	0.229	0.005	0.486	19.667	-0.002
2015	0.027	0.042	0.194	0.007	0.511	19.786	0.037
2016	0.027	0.028	0.181	0.005	0.589	20.218	0.089
2017	0.029	0.029	0.171	0.007	0.601	20.324	0.014
2018	0.033	0.030	0.165	0.005	0.621	20.540	0.012
2019	0.031	0.029	0.153	0.007	0.603	20.637	0.014
2020	0.029	0.026	0.128	0.011	0.586	20.860	-0.115
Grand Average	**0.028**	**0.029**	**0.194**	**0.007**	**0.535**	**19.993**	**0.025**

* Per year values not averages.

Correlation Matrix

Table 4 demonstrates the univariate correlation between study variables across the sample period. Size, operational expenses, and loan to deposit are all positively connected with net interest margin while there is a negative correlation between risk aversion (CAP), credit risk, and GDP with NIM. The strongest correlation between independent variables, a negative 77 percent between size and risk aversion, is not considered a threat to the estimation process via Multicollinearity since it is less than the 80% threshold (Gujarati & Potter, 2009).

Table (4): Univariate correlations between variables.

Variable	NIM	SIZE	CAP	CR	OC	LTD	GDP
NIM	1.00						
SIZE	0.37	1.00					
CAP	-0.30	-0.77	1.00				
CR	-0.03	-0.09	0.14	1.00			
OC	0.20	-0.25	-0.01	0.06	1.00		
LTD	0.31	0.08	-0.03	0.07	0.61	1.00	
GDP	-0.11	-0.29	0.21	-0.10	0.00	-0.13	1.00

Estimated models

The estimated regressions using pooled OLS, pooled with robust standard errors, fixed effect model (FE), random effect model (RE), difference GMM, and system GMM are shown in Table 5 in models 1 to 6, respectively. Models 1 to 4 present the static specifications while models 5 and 6 present the dynamic specifications. The observations, R-squared, Durbin-Watson, and F-static are presented for each static model. The R-square is 70 and 71 percent, respectively for Model 2 and Model 3 while it is much lower for the other two models. Adding explanatory variables to the model should result in a penalty shown by the adjusted R-square and the results signify that the same two models are of higher quality.

In addition, the results of two tests were utilized to choose the best static model; the redundant fixed effects F test is 10.9 with a probability of less than 1%. As a result, we reject the null hypothesis and accept the alternative, which asserts that there is a distinction between pooled and fixed effects and that the superior model is the fixed effects. Then, the Hausman test is performed and the chi-squared is 14.3 with a probability of less than 1%. As a result, the alternative hypothesis that FE is better than RE for estimating the model is accepted. Though tests allude to choose Model 3, some properties of Model 2 are also preferable. Durbin Watson of Model 2 is closed to 2 indicating the absence of an autocorrelation problem and the R-Square is close to that of Model 3. In addition, all the standard errors are robust to heteroscedasticity in both Model 2 and Model 3. The last two models present the results of the difference and two-step system GMM estimators. The Hansen test for the validity of instruments is not rejected meaning that instruments are valid. The "no second order serial correlation" null hypothesis is not rejected as well. These two conditions are the crucial conditions for estimating a GMM type models meaning that we can proceed with GMM modeling. The two-step system GMM has better properties than difference GMM (Roodman, 2009). To conclude, Model 2 and Model 3 are the best-unbiased estimators for this study in the static framework and Model 6 is the best estimator for the dynamic framework. However, the results will be discussed in light of all models.

Table (5): The estimation results.

Dependent Variable: NIM	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Independent variables	**Pooled**	**Robust standard errors**	**FE**	**RE**	**Difference GMM**	**System GMM**
SIZE	0.003***	0.002	0.000	0.003**	0.003	-0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)
CAP	0.005	0.051**	0.029**	0.016	0.023	0.056*
	(0.009)	(0.025)	(0.011)	(0.011)	(0.014)	(0.026)
CR	-0.013	-0.052	-0.145**	-0.110**	-0.027	-0.091
	(0.064)	(0.055)	(0.057)	(0.051)	(0.095)	(0.057)
OC	0.216*	0.570***	0.262**	0.174	0.370	0.533***
	(0.116)	(0.158)	(0.103)	(0.111)	(0.318)	(0.151)
LTD	0.004	0.015***	0.008***	0.009**	-0.003	0.011***
	(0.004)	(0.005)	(0.002)	(0.004)	(0.009)	(0.003)
GDP	0.003	-0.003	-0.005	0.005	0.010	-0.008
	(0.009)	(0.006)	(0.009)	(0.007)	(0.015)	(0.007)
L.NIM					0.431*	0.253
					(0.224)	(0.185)
R-squared	0.245	0.700	0.709	0.213		
Adjusted R-squared	0.201	0.675	0.647	0.167		
Durbin-Watson stat	0.505	1.889	1.147	1.001		
F-statistic	5.53***	27.38***	11.41***	4.61***		
Observations	109	90	109	109	96	79
Redundant Fixed Effects Test (Cross-section F)			10.90***			
Correlated Random Effects-Hausman Test (Chi Sqr)				14.32***		
AR1 p					0.151	0.381
AR2 p					0.151	0.358
Hansen p					0.327	0.354

Notes:
Model 1: Pooled OLS.
Model 2: Period weights (PCSE) standard errors & covariance and an AR(1) term.
Model 3: Cross-section fixed effect and White cross-section (period cluster) standard errors & covariance.
Model 4: Cross-section random effects.
Model 5: Difference GMM
Model 6: Two-step system GMM

Standard errors are between parentheses. ***, ** and * indicate significance at 1%, 5% and 10% respectively. All regressions have a constant but are suppressed for clarity.

Size has a positive effect in Models 1 and 4. Larger banks have larger operations that are more vulnerable to risk, they need additional margin to compensate. The bank's assets have grown as a result of loan growth. If the bank accepts an excessive number of non-performing loans, the cost to consumers will rise to compensate for the increased loss provision, resulting in a higher net interest margin. The findings are congruent with those of Maudos and Solís (2009), Raharjo et al. (2014), Aboagye et al. (2008)

and Afanasieff et al. (2002). However, it contradicts Khan and Jalil (2020), Fungáová and Poghosyan (2011), Yuksel and Zengin (2017), Hawtrey and Liang (2008), and Maudos and De Guevara (2004) who propose that large banks can lessen the risk of keeping loans by diversifying or updated technology (Lee & Isa, 2017), hence lowering NIM. The results of no influence of size on NIM in models 2, 3, 5, and 6 is consistent with other literature (Cruz-García & Fernandez de Guevara 2020; Angori et al., 2019; An & Loan, 2017; Obeid & Adeinat, 2017; Islam & Nishiyama, 2016; Schwaiger & Liebeg, 2008; Williams, 2007).

In Models 2, 3 and 6, the risk aversion variable is shown to be positive and significant, implying that banks working in Palestine are risk-averse and operate with a higher margin for carrying additional risk. The finding is consistent with Asmar's (2018) prior observation that banks facing higher risk should employ a higher NIM. Angori et al. (2019) observed a positive relationship between risk aversion and a bank's attitude toward risk, which has been increasing since the financial crisis. As a result, during the financial crisis, banks with more risk-averse practices boosted interest rates and consequently NIM. Khan and Jalil (2020) discovered that banks that follow solvency regulations generate a higher NIM. Furthermore, according to Obeid and Adeinat (2017), banks with high equity to asset ratio committed cash to sustain their capital base to withstand various risks, and banks handled the liquidity drain by boosting interest rates, resulting in higher NIM. Moreover, Lee and Isa (2017) found that equity financing reduces profitability hence banks compensate for that by a higher margin. Hawtrey and Liang (2008) found that risk-averse managers prefer extra interest margin. Islam & Nishiyama (2016) found solvent banks to operate with higher NIM. According to Aboagye et al. (2008), banks impose larger margins to suit the demands of expanding shareholders. Furthermore, well-capitalized banks are thought to be more stable during economic downturns and more secure for consumers (An & Loan, 2017). The positive finding is also consistent with other literature (Abdulhakim, 2019; Entrop et al., 2015; Fungáová & Poghosyan, 2011; Williams, 2007; Schwaiger & Liebeg, 2008). Whereas the no effect of risk

aversion on NIM is consistent with Endri et al. (2021) and Cruz-García, and Fernandez de Guevara (2020).

Credit risk is inversely connected to NIM in all models, however, it is significant in models 3 and 4. When a bank has a high non-performing loan (NPL) ratio, depositors will seek a higher interest rate on deposits to compensate for the bank's risk, which costs the bank. A high saving rate reduces the amount of interest earned, resulting in a lower NIM for the bank. According to Yuksel and Zengin (2017), bad loans reduce interest and NIM earnings. Fungáová and Poghosyan (2011) support the market discipline theory for Russia (Karas et al., 2010) which state that customers of banks with high non-performing loan percentages require higher rate on deposits resulting in lower NIM. Furthermore, the findings of the study are consistent with Khan and Jalil (2020), who argue that management approach in growing credit portfolios to gain a larger market share while neglecting the risk from these loans and advances result in reduced margins. Furthermore, banks prefer lower margins when their firms and consumers are in poor financial condition (Endri et al., 2021). Moreover, Williams (2007) found banks are not pricing credit risk right as well as they prefer increasing market share to loan quality. Dumičić and Rizdak (2013) noticed that banks cannot incur interest on bad loans. The study finding, on the other hand, contradicts Suu et al. (2020), who found it positive since banks pass credit risk to customers, and Raharjo et al. (2014), who concluded that large loss reserve drives banks to raise interest income. It seems that Palestinian banks could not pass credit risk to customers due to severe competition. However, other research has found no effect (Cruz-García, & Fernandez de Guevara, 2020; Islam & Nishiyama, 2016; Entrop et al., 2015; Ben Khediri & Ben-Khedhiri, 2011; Zhou & Wong, 2008; Aboagye et al., 2008) consistent with some of our specifications.

Models 1, 2, 3 and 6 have a positive and significant effect on operating expenses. The discovery demonstrates that Palestinian banks pass on operating costs to clients in the form of higher interest rates. The findings are congruent with Islam and Nishiyama (2016), who observed that inefficient banks charge greater margins to customers in South Asia, and Suu et al. (2020), who discovered that inexperienced banks rely on operating costs

to grow by passing them on to customers. The findings are also consistent with those of Lee and Isa (2017, Fungáová and Poghosyan (2011), Maudos and Solís (2009), Angori et al., 2019; Khan and Jalil (2020), Entrop et al (2015), Williams (2007), Afanasieff et al. (2002), Lee and Isa (2017), Maudos and De Guevara (2004), Zhou and Wong (2008), Hawtrey and Liang (2008), Gounder and Sharma (2012), Ben Khediri and Ben-Khedhiri (2011), Cruz-García, and Fernandez de Guevara (2020), Tarus et al. 2012, and Schwaiger and Liebeg (2008). Banks raise their margins to pay their operating expenses. The results are inconsistent with Abdulhakim (2019) who believe that government intervention and competition pressure stopped banks from passing their operating cost to the customer through increasing interest. Other investigations found no effect of operating expense on NIM (Asmar, 2018).

Except for Model 1 and 5, a loan to deposit has a positive relationship with NIM. According to the data, the larger the loans produced from deposits, the greater the NIM. The ratio, according to Raharjo et al. (2014), shows the fraction of lending activities that rely on money obtained from client deposits. Because of the growth in loans to deposits, interest revenue from customers should exceed interest paid to depositors. The outcome is consistent with Endri et al (2021). Islam and Nishiyama (2016) and An and Loan (2017), on the other hand, discovered a negligible effect of this variable.

GDP growth is insignificant in all models. The result is congruent with the findings of Cruz-García, and Fernandez de Guevara (2020), Maudos and Solís (2009), Drakos (2002), Abdulhakim (2019), Dumičić and Rizdak (2013), and Schwaiger & Liebeg (2008) who reported no effect of GDP on net interest margin. Obeid and Adeinat (2017) discovered a positive effect since economic expansion creates a favorable climate for launching new ventures or expanding existing ones, putting pressure on loan demand and resulting in an increase in bank interest revenue, resulting in a higher NIM. Also, Claeys and Vander Vennet (2008) found good economic growth to be linked to lower defaults which encourage banks to offer loans in Western Europe. This is not the case of Palestine. The study's findings also contradict those of Entrop et al. (2015), who contend that banks compete in

the loan market during economic recovery by lowering credit requirements. Moreover, Brock and Suarez (2000) argue that during good economic conditions, banks reduce loan rates to lower loan default risk. Claeys and Vander Vennet (2008) found that in transition nations, economic growth is volatile and interrupted by crisis hence, not affecting NIM positively. Finally, the lagged dependent variable is weakly significant at the 10% level in Model 5 and insignificant in Model 6. These results add doubt to the dynamic nature of the research problem. The previous level of NIM is not a main determinant of the current NIM in Palestine.

Conclusion

This paper investigated the determinants of the net interest margin of banks in Palestine, a unique country with poor governance, political uncertainty, and regulatory insufficiency. The sample is comprised of 15 commercial banks for the period 2011–2020. The research utilized a pooled OLS, a fixed-effect model, a random effect model, a robust pooled OLS, a difference GMM, and a system GMM estimators. Evidence collected supports that net interest margin is positively influenced by risk aversion, operating costs, and loan to deposit, while negatively related to credit risk. The effect of size is positive but not robust.

The aim of policymakers is to reduce NIM in order to reduce intermediation costs and increase social welfare. Bank management, on the other hand, will be happy with a lower NIM only in the case of a highly competitive environment. Otherwise, high NIM is connected with high profitability, hence preferred. The study recommends banks to take into consideration these factors (size, risk aversion, credit risk, operating expenses, and loan to dopiest) when pricing the interest on loans and deposits. The results imply that banks and policymakers can increase efficiency by better controlling these factors. Operating costs are of special importance since they can be reduced by implementing efficient banking technologies and improving management practices that reduce the cost of staff. It means that commercial banks should create FinTech apps and online banking services so that customers can manage their accounts from the comfort of their own homes. This includes transferring money, checking accounts, managing investments, and paying back loans.

There are some limitations to this work. Because Islamic banks differ from conventional banks, they were excluded. Furthermore, some important factors that may affect the strength of the relationships, such as ownership structure, were not investigated. New factors that may moderate the factors affecting NIM should be considered in future research. Special attention is paid to the bank's ownership structure and type, whether Islamic or conventional.

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